4th

5th

6th

7th

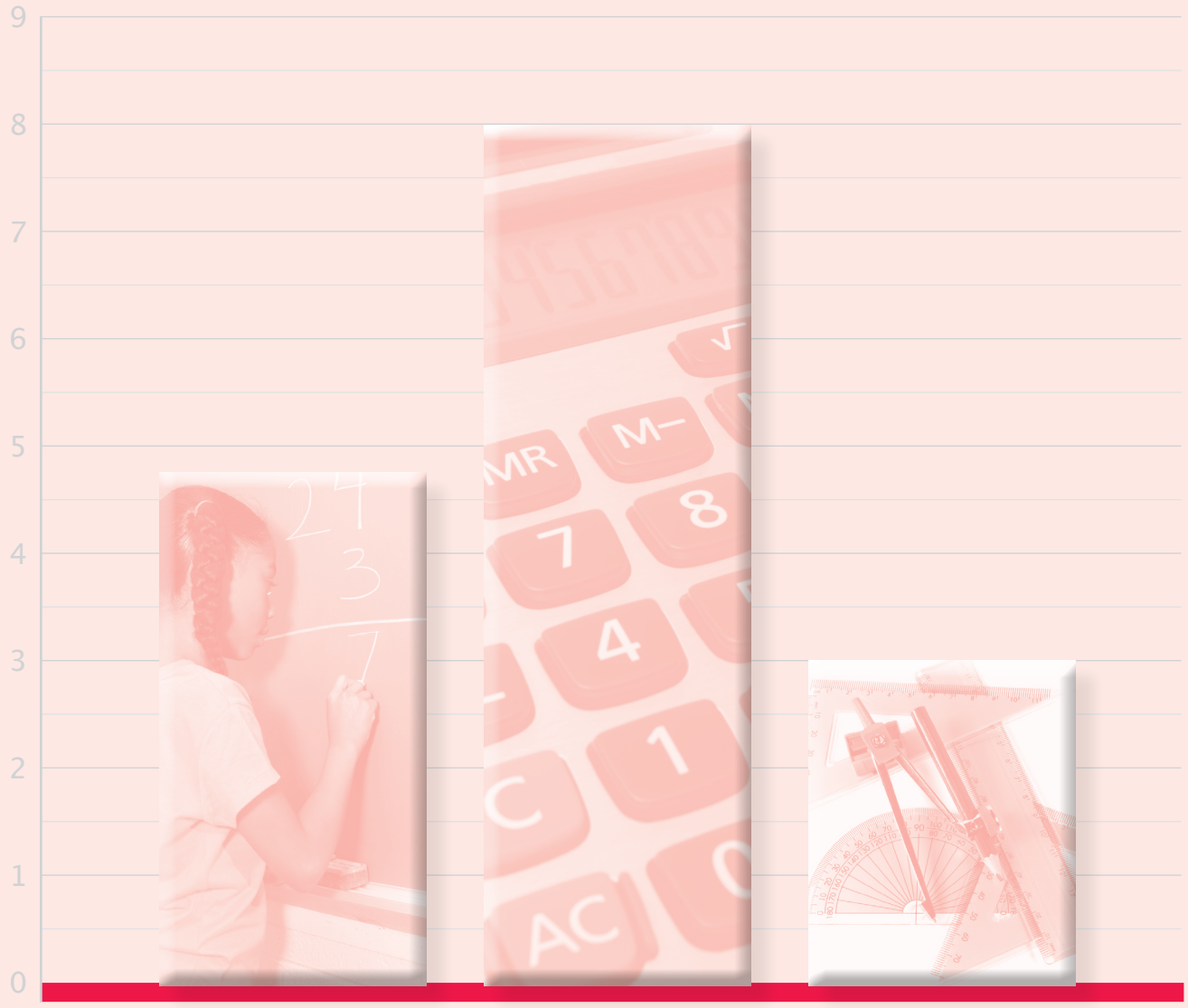
8th

Grade 8

meap™

Michigan Educational Assessment Program

Item Descriptors



MATHEMATICS

FALL 2011

MICHIGAN STATE BOARD OF EDUCATION
STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW

The Michigan State Board of Education complies with all Federal laws and regulations prohibiting discrimination and with all requirements and regulations of the U.S. Department of Education. It is the policy of the Michigan State Board of Education that no person on the basis of race, color, religion, national origin or ancestry, age, sex, marital status, or handicap shall be discriminated against, excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination in any program or activity for which it is responsible or for which it receives financial assistance from the U.S. Department of Education.

NOTE: For each item listed throughout this booklet, the first statement is a summary of the Michigan Grade Level Content Expectation (GLCE) and the second statement is the descriptor for the item's stem or question.

Students were instructed to read the directions below silently as the test administrator read them aloud.

PART 1

Part 1

DIRECTIONS:

In this part, you will answer multiple-choice mathematics questions. Some questions will ask you to view a picture, chart, or other mathematics-related information. Use that information with what you know to answer the question. You may **NOT** use a calculator for this part of the test.

You must mark all of your answers in Part 1 of your **Answer Document** with a No. 2 pencil. You may underline, highlight, or write in this test booklet to help you, but nothing in this test booklet will be scored. No additional paper may be used.

Mark only one answer for each question. Completely fill in the corresponding circle on your **Answer Document**. If you erase an answer, be sure to erase completely. Remember that if you skip a question in the test booklet, you need to skip the answer space for that question on the **Answer Document**. If you are not sure of an answer, mark your **best** choice.

A sample question is provided for you below.

Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the **least** number of cases that Marty will need to hold all his CDs?

A 8

B 9

C 10

D 11

For this sample question, the correct answer is **C**. Circle **C** is filled in for the sample question on your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page. If you finish early, you may go back and check your work in Part 1 of the test **ONLY**. Check to make sure that you have answered every question. Do **NOT** look at any other part of the test.

NOTE: The directions for Part 2 are the same as the above instructions, but with calculators allowed.

MEAP GRADE 8 MATHEMATICS TEST
Reference Sheet

Use this information as needed to answer questions on the MEAP Grade 8 Test.

Miscellaneous

Distance = rate × time

Interest = principal × rate × time

$\pi \approx 3.14$

Algebra

Straight Line: $y = mx + b$

If (x_1, y_1) and (x_2, y_2) are on a line, then

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Area


Triangle: $A = \frac{1}{2}(\text{base}) \times \text{height}$

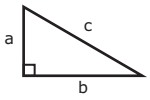

Rectangle: $A = \text{base} \times \text{height}$


Trapezoid: $A = \frac{1}{2}(\text{sum of the bases}) \times \text{height}$


Parallelogram: $A = \text{base} \times \text{height}$


Circle: $A = \pi r^2$ Circumference $= 2\pi r = \pi d$

Right Triangles



$a^2 + b^2 = c^2$

Total Surface Area		Volume	
Cylinder:	SA = circumference of the base × height + $2\pi r^2$		V = πr^2 × height
Cube:	SA = 6 × (length of edge)^2		V = (length of edge)^3
Pyramid:	SA = $\frac{1}{2}$ (perimeter of base) × (slant height) + area of the base		V = $\frac{1}{3}$ (area of base) × (altitude)
Sphere:	SA = $4\pi r^2$		V = $\frac{4}{3}\pi r^3$
Cone:	SA = $\frac{1}{2}$ (circumference of base) × (slant height) + πr^2		V = $\frac{1}{3}\pi r^2$ × height
Prism:	SA = sum of the area of the faces		V = area of base × height

1 **A.RP.07.01:** Recognize proportional or linear relationships.

Identify the graph that represents a single linear equation.

A incorrect graph

B incorrect graph

C incorrect graph

D correct

2 **A.RP.07.02:** Represent proportional or linear relationships.

Given a linear equation and context, identify the corresponding graph.

A correct

B correct slope, used slope as starting point

C switched measurements on axes, i.e., reciprocal of slope

D correct labels, but used half of correct slope

3 **A.RP.07.02:** Represent proportional or linear relationships.

Translate words to an equation.

A correct

B equation only works with one set of variables

C transposed variables

D incorrect equation with coefficients from text

4 **N.FL.07.07:** Solve problems involving operations with integers.

Subtract a negative integer from a positive integer to solve a word problem.

A multiplied instead of subtracted

B divided

C added

D correct

5 **N.FL.07.07:** Solve problems involving operations with integers.

Find the temperature after a steady decrease over time.

A started with additive inverse of starting temperature

B correct

C absolute value of solution (transposed signs)

D added instead of subtracted

6 **N.FL.07.08:** Compute with negative rational numbers.

Add given positive and negative integers.

A added all numbers as positive

B additive inverse of solution

C correct

D 10 greater than solution

7 **N.FL.07.08:** Compute with negative rational numbers.

Subtract a negative decimal from a negative decimal.

A correct

B made minuend positive, then subtracted smaller values from larger values

C added instead of subtracted

D made both numbers positive, then added

8 **N.FL.07.09:** Estimate the results of computations with rationals.

Estimate the fractional portion of a dollar amount.

A correct

B more than half of correct estimate

C half of correct estimate

D less than half of correct estimate

9 **N.FL.07.09:** Estimate the results of computations with rationals.

Estimate the number of days needed to drive a given distance.

A fewer days than estimate

B fewer days than estimate

C correct

D more days than estimate

10 **A.PA.07.01:** Know proportional or linear relationships.

Identify the table with data that represents a linear relationship.

A correct

B quadratic relationship

C non-linear relationship

D quadratic relationship

11 **A.PA.07.06:** Calculate slope from a graph of a linear function.

Calculate the slope from a graph of a linear function as a fraction.

A -x/y

B -y/x

C correct

D x/y

12 **A.PA.07.06:** Calculate slope from a graph of a linear function.

Calculate the slope as a fraction, given two points on a line.

A x/y

B incorrect subtraction

C correct

D added x values

13 **A.PA.07.11:** Understand and use the basic properties of real numbers.

Find the multiplicative inverse of a fraction.

A additive inverse of denominator

B additive inverse

C not multiplicative inverse

D correct

14 **A.PA.07.11:** Understand and use the basic properties of real numbers.

Use the distributive property to find the equivalent algebraic expression.

A $a(bx + y) = bx + ay$ (where a and b are constants)

B $a(bx + y) = (a \times b)x + y$

C correct

D $a(bx + y) = (a \times b)(x \times y)$

15 **A.FO.07.12:** Compute simple linear algebraic expressions.

Subtract one algebraic expression from another.

A added constants instead of subtracted

B added variables instead of subtracted

C correct

D added variables, changed sign on first constant and then added constants

16 **A.FO.07.12:** Compute simple linear algebraic expressions.

Add and subtract to simplify a linear expression.

A correct

B added and subtracted variables from constants

C added instead of subtracted variables and constants

D added instead of subtracted constants

17 **D.RE.07.01:** Select and interpret graphical representations.

Interpret a circle graph.

A used incorrect category

B correct

C number of cups from text, did not use graph data

D multiplied by 2, instead of dividing by 2

18 **D.RE.07.01:** Select and interpret graphical representations.

Interpret a stem-and-leaf plot and find the median.

A correct leaf, but did not include stem

B incorrect median

C mode

D correct

19 **D.AN.07.02:** Interpret scatterplots; use an estimated line of best fit.

Identify the equation that represents the line of best fit.

A correct y-intercept, additive inverse of slope

B correct

C incorrect y-intercept, incorrect slope

D incorrect y-intercept, incorrect slope

20 **D.AN.07.02:** Interpret scatterplots; use an estimated line of best fit.

Interpret the scatterplot to estimate the temperature at a given elevation.

A maximum temperature denoted on vertical axis

B temperature with most close points

C correct

D temperature with several close points

21 **N.FL.07.03:** Calculate rates of change, including speed.

Calculate the rate in inches per minute of filling an empty pool.

A incorrect rate: half of correct rate

B correct

C inches – minutes

D inches × minutes

22 **N.FL.07.03:** Calculate rates of change, including speed.

Determine which of four friends can text the fastest.

A fewest minutes

B greatest total, not greatest words per minute

C intermediate total and minutes

D correct

23 **N.MR.07.04:** Convert ratio quantities between systems of units.

Convert miles per hour to feet per second, given 1 mile = 5280 feet.

A mph × 3600/5280

B miles per hour = feet per second

C correct

D 5280 × measure of mph as fraction of hour

24 **N.MR.07.04:** Convert ratio quantities between systems of units.

Convert yards per second to miles per hour, given 1 mile = 1760 yards.

A yards/sec × 1760/3600

B yards/sec = mph

C correct

D rounded up to nearest whole number

25 **N.FL.07.05:** Solve proportion problems.

Find the lowest unit cost from the given table.

A lowest total cost

B correct

C intermediate volume and total cost

D greatest volume and total cost

26 **N.FL.07.05:** Solve proportion problems.

Find the number of defective microchips, given the rate of defective chips per batch.

A total number of chips ÷ (defective chips × sample size)

B sample size ÷ number of defective chips, then ÷ 10

C correct

D incorrect number of defective chips

27 **A.PA.07.03:** Graph linear equations and interpret the slope.

Identify the graph of a starting dollar amount, adding a fixed amount per week.

A correct

B used starting amount as slope

C correct y-intercept, but no weekly deposits

D transposed measurements on axes

28 **A.PA.07.03:** Graph linear equations and interpret the slope.

Evaluate y = kx for specific values.

A used k/2

B correct

C used k = 1, i.e., ignored coefficient

D used 1/k

29 **A.PA.07.04:** Solve applied linear problems with graphs and equations.

Interpret a graph to find the greatest number of students for a trip.

A one student less than maximum

B correct

C one student more than maximum

D greatest number of four options

30 **A.PA.07.04:** Solve applied linear problems with graphs and equations.

Determine the distance, given the time and rate.

A rate ÷ distance

B time + distance

C used slower rate

D correct

31 **A.PA.07.05:** Solve proportion problems.

Calculate the number of cookies, given the proportion.

A omitted factor

B omitted factor

C correct

D repeated factor

32 **A.PA.07.05:** Solve proportion problems.

Identify the directly proportional relationship in equation form.

A linear but not directly proportional

B correct

C linear but not directly proportional

D linear but not directly proportional

33 **G.TR.07.03:** Know the properties of similar figures and scale factor.

Given that two triangles are similar, identify the congruent angles.

A not necessarily congruent angles

B not necessarily congruent angles

C not necessarily congruent angles

D correct

34 **G.TR.07.03:** Know the properties of similar figures and scale factor.

Given two rectangles, find the length of the side to make them similar.

A ratio of lengths of sides of smaller rectangle

B divided by scale factor, instead of multiplied

C correct

D rounded scale factor up to nearest whole number

35 **G.TR.07.04:** Solve problems about similar figures and scale factor.

Find the height of a flag pole using similar triangles.

A divided by scale factor instead of multiplying

B added three measurements given in diagram

C correct

D added scale factor to flag pole length

36 **G.TR.07.04:** Solve problems about similar figures and scale factor.

Find the length of a side in a similar trapezoid.

A correct

B scale factor is difference in side lengths

C did not apply any scale factor

D sum of corresponding side lengths

37 **G.TR.07.05:** Show the similarity of triangles using properties.

Find the side length of a similar smaller triangle.

A difference in leg lengths of larger triangle

B correct

C difference in leg lengths of larger triangle + leg length of smaller triangle

D corresponding leg of smaller triangle is greater than larger triangle

38 **G.TR.07.05:** Show the similarity of triangles using properties.

Given a diagram of two triangles, find the measurement needed to show similarity by SAS.

A correct

B correct measurement but incorrect side

C incorrect measurement, correct side

D incorrect measurement, incorrect side

39 **G.TR.07.06:** Know similar figures with a scale factor of r have areas related by r^2.

Given the scale factor, find the area of a second rectangle.

A area of first rectangle

B used scale factor of r

C difference in areas of two rectangles

D correct

40 **G.TR.07.06:** Know similar figures with a scale factor of r have areas related by r^2.

Given two triangles and the area of the smaller one, find the area of the larger triangle.

A used scale factor of r

B squared area of smaller triangle

C scale factor r as difference in side lengths

D correct

41 **A.RP.07.10:** Know the graph of y = k/x.

Given y = k/x, identify the corresponding graph.

A fourth quadrant portion reflected over x-axis

B correct

C linear graph

D linear graph

42 **N.MR.07.02:** Solve problems involving derived quantities.

Use the weighted average and overall grade to find the test scores.

A less than missing test scores

B given overall course grade (weighted average)

C correct

D more than missing test scores

43 **A.PA.07.09:** Recognize inversely proportional relationships.

Given a table of values, translate to an equation.

A y = x/0.5k

B y = 0.5k/x

C y = x/k

D correct

44 **N.MR.07.06:** Understand the concept of square root and cube root.

Estimate the positive square root of a positive integer.

A correct

B half of the given integer

C twice the given integer

D the square of the given integer

45 **A.PA.07.07:** Graph linear equations; interpret the slope and y-intercept.

Given an equation, find the y-intercept.

A additive inverse of y-intercept

B slope

C additive inverse of x-intercept

D correct

46 **A.FO.07.08:** Know the solution to a linear equation.

Given an equation in standard form, find the intercepts.

A correct

B transposed x and y for both intercepts

C incorrect intercepts

D incorrect intercepts

47 **A.FO.07.13:** For applied situations, solve linear equations.

Find the rental car miles resulting in the same charge from two agencies.

A different total charges

B different total charges

C correct

D different total charges

48 **D.AN.07.03:** Interpret relative and cumulative frequencies.

Calculate the total number of students represented in a bar graph.

A value of highest bar

B maximum value shown on vertical axis (labeled students)

C correct

D included one value from horizontal axis

49 **D.AN.07.04:** Find and interpret the median, quartiles, and IQR.

Find the lower quartile for the listed data.

A minimum value

B correct

C data point not in data set

D median

4th

5th

6th

7th

8th

MICHIGAN Department of Education

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